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ABSTRACT

The report of the National Longitudinal Transition Study presents initial findings on characteristics of school dropouts since 1985-86 among more than 8,000 youth (ages 13 to 23) with disabilities. The report also addresses characteristics of schools or programs that may affect the decision to drop out among disabled youth. The first section compares the secondary special education population to the nonhandicapped student population noting such differences as increased numbers of males, single parent backgrounds, and tendency to stay in high school longer for the disabled population. The next section describes the incidence of and reasons for dropping out among youth with disabilities. The graduation rates for youth with orthopedic, visual, or hearing impairments approach the rate for nondisabled students, while graduation rates for youth with emotional disturbances, mental retardation, or multiple handicaps are below 50%. Dropout reasons are similar to those for nondisabled students--not liking school, not doing well in school, and behavior problems in school. No significant school characteristics were found to relate to incidence of dropping out in this population. Dropping out was related to student age, sex, ethnicity, previous disciplinary problems, and degree of social integration. Tables provide detailed statistical data and the appendix gives an overview of the study. (DB)

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DROPOUTS: THE RELATIONSHIP OF STUDENT CHARACTERISTICS, BEHAVIORS, AND PERFORMANCE FOR SPECIAL EDUCATION STUDENTS

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DROPOUTS: THE RELATIONSHIP OF STUDENT CHARACTERISTICS, BEHAVIORS, AND PERFORMANCE FOR SPECIAL EDUCATION STUDENTS

Introduction

The widespread concern about the national dropout problem has stimulated much research on dropout statistics, the background characteristics of dropouts, and student behaviors and attitudes common among dropouts (Combs and Cooley, 1969; Bachman, Green, and Wirtanen, 1971; Rumberger, 1987; Peng and Taki, 1983). Most of this research has been conducted on the nonhandicapped population. Although some research is available on the problem of dropping out among youth with disabilities, it was generally based on data from single states or small numbers of districts (Fardig, et al., 1985; Hasazi, Gordon, and Roe, 1985; Appelbaum and Dent, 1986; Lichtenstein, 1988; Edgar, 1987; Levin, Zigmond, and Birch, 1985). The National Longitudinal Transition Study of Special Education Students provides one of the first looks at national dropout data for youth with disabilities. From this research, we have found that special education students are dropping out at a rate higher than the regular education population. There are also some indications that the behavioral and attitudinal correlates of dropping out are similar for high school students with and without disabilities.

Although research on the individual correlates of dropping out is interesting, it focuses attention on students as the source of the problem and on characteristics over which schools have little control (e.g., educators cannot change the socioeconomic status of a student's family nor change the fact that a student may have been born with a learning handicap). This line of research, although informative, offers limited help to practitioners because it does not look at the policies and practices of schools (e.g., graduation requirements, special diplomas or certificates) that may be moderating or contributing to the dropout problem (McDill, Natriell and Pallas, 1985; Bodner, Clark and Mellard, 1987; Rachal and Ponthieux, 1988). Recent research suggests that school practices or culture, such as the structural organization of schools, the establishment of a social bond between students, and the norms governing the institution, may have a great deal to do with dropping out or staying in school (Wehlage, 1988; Coleman and Hoffer, 1987). Current research

suggests several characteristics of schools or programs that may affect the decision to drop out among nondisabled youth: (1) school size and climate, (2) smaller classes, in which teachers can relate to students in a more personalized way, (3) individualized instruction and a modified curriculum that responds to students' abilities and needs, (4) a focus on basic skills, and (5) school work that has meaning outside the classroom, such as experiential learning and work study programs (Wehlage, 1983; Sherman, 1987). Little is known about whether these or other school or program characteristics affect the dropout behavior of youth with disabilities. This paper addresses this gap in the knowledge base concerning school completion of special education students.

The next section provides a brief background on the secondary special education population--who these students are, compared to nonhandicapped students. Section 3 describes the incidence of and reasons for dropping out among youth with disabilities. The fourth section presents multivariate analyses of factors associated with dropping out. In the last section we discuss the implications of our findings.

The Secondary Special Education Population

The analyses reported here are based on data from the National Longitudinal Study of Special Education Students sponsored by the Office of Special Programs (OSEP) of the U.S. Department of Education and conducted by SRI International (see appendix for more on the study). The National Longitudinal Transition Study (NLTS) reports on the transition experiences of a nationally representative sample of more than 8,000 youth with disabilities in the 11 federal disability categories. For the purpose of analyzing dropout behavior, data for approximately 3,000 youth with disabilities who exited high school in 1985-86 or 1986-87 are used. NLTS data were obtained in 1987 from a number of sources: telephone interviews with parents, abstracts of the students' school records, and a school survey. Data collection will be repeated in 1990.

Youth in our sample are those diagnosed as having a disability by their school or their school district. The nature of their primary disability is defined by one of the 11 federal handicapping conditions: learning disabled,

emotionally disturbed, mentally retarded, speech impaired, visually impaired, deaf, hard of hearing, orthopedically impaired, other health impaired, multiply handicapped, and deaf/blind. The majority of youth receiving special education services are categorized as having a learning disability (56%) as their primary handicapping condition. Youth categorized as having mental retardation account for more than 1 in 5 secondary-age youth with disabilities (24%) and those with emotional disturbances or behavior disorders are 10% of the population. All other primary disabilities are relatively low-incidence conditions (2% to 4% per condition), as indicated in Table 1.

When discussing youth with disabilities, it is tempting to assume that it is only the presence of a disability that distinguishes them from their nondisabled peers. However, the data in Table 1 indicate that youth with disabilities differ from other students in several respects in addition to the presence of a disability. Youth with disabilities are disproportionately male, largely due to the prevalence of males among youth with learning disabilities, the largest disability category. Special education students are also more likely to stay in high school until they are older. For example, 46% of 18- and 19-year-olds with disabilities are still enrolled in secondary school, compared to less than 12% for nondisabled 18- and 19-year-olds. Youth with disabilities are also less likely than their nondisabled peers to be attending schools in suburban areas.

Special education students are also significantly more likely than nondisabled students to come from low income, single parent families with heads of households who have relatively little education. These economic and family structure factors have long been known to present their own obstacles to educational achievement and later outcomes (see for example, Wetzel, 1987; William T. Grant Foundation, 1988). As evidenced in the general population, lower socioeconomic status contributes significantly to the likelihood of youth dropping out of school, becoming involved with the criminal justice system, and doing poorly in the competitive job market. Hence, not only does the presence of a disability create a challenge for special education students in school and in the transition to adulthood, but youth with disabilities are also more likely than their nonhandicapped peers to be battling the often negative effects of poverty or to be in a single-parent family.

Table 1
COMPARISON OF INDIVIDUAL AND FAMILY CHARACTERISTICS
OF YOUTH WITH DISABILITIES AND NONDISABLED YOUTH

Characteristics	Percentage of Youth With Disabilities	Percentage of Youth in the General Population
Primary disability		
Learning disabled	55.7	
Mentally retarded	23.8	
Emotionally disturbed	10.5	
Speech impaired	3.4	
Deaf/hard of hearing	1.7	
Visually impaired	.7	
Other health impaired	1.3	
Orthopedically impaired	1.2	
Deaf/blind, multiply handicapped	1.6	
(Number of respondents)	(8414)	
Demographic Factors		
Gender		
Male	68.5	49.7[1]
Female	31.5	50.3
(Number of respondents)	(8398)	
In secondary school at age:		
14-15	94.4	97.7[2]
16-17	86.2	88.1
18-19	46.2	11.5
20-21	19.2	1.3
22-24	6.3	.5
(Number of respondents)	(8278)	
Attending school in area that is:		
Urban	31.6	22.3[1]
Suburban	33.7	47.9
Rural	34.7	28.7
(Number of respondents)	(8408)	
Ethnicity		
Black	24.2	12.2[1]
White	65.0	70.0
Hispanic	8.1	12.6
Other	2.7	5.2
(Number of respondents)	(7142)	
Socioeconomic Factors		
In single-parent family	36.8	28.6[3]
(Number of respondents)	(6651)	
Highest education of household head		
Less than high school	41.0	31.1[1]
High school graduate	36.0	27.8
Some college/2-year degree	14.0	20.9
College degree or more	8.9	13.6
(Number of respondents)	(6651)	
Annual household income		
< $25,000	67.7	55.0[4]
≥ $25,000	32.2	45.1
(Number of respondents)	(6172)	

1 Center for Education Statistics, 1987b, p. 8.1-2.3 (sophomore cohort, base year)

2 U.S. Department of Commerce, Bureau of the Census, 1988, p. 59.

3 U.S. Department of Commerce, Bureau of the Census, 1987c, p. 28 (includes youth 15 to 17 years old).

4 U.S. Department of Commerce, Bureau of the Census, 1987, p. 3.

Source: NLTS data on individual and family background characteristics are based on parent interviews.

The Incidence of and Reasons for Dropping Out

Table 2 presents dropout and graduation rates derived from various sources. Although each source calculates rates slightly differently, most definitions of dropouts include persons who voluntarily or involuntarily leave secondary school before graduation. The most commonly quoted annual dropout rate is around 25% for the total school population. As seen in Table 2, the range of dropout rates for nondisabled youth is from 14% to 29%. Drop out rates based on NLTS data drawn from individual student records and from parent reports range from 26% to 36% for disabled youth. Despite the variation in calculation methods, the dropout rate for special education students is generally higher than that for their nondisabled peers, and the graduation rate of youth with disabilities is considerably lower than it is for nondisabled youth.

Unlike their nondisabled peers, three methods of exit from secondary school are common to youth with disabilities. As with nondisabled youth, special education students graduate (receiving a diploma or certificate of completion) or voluntarily leave school (dropping out). Special education students also leave school because they reach the maximum age for school attendance (i.e., "aging out"). Table 3 indicates the percentage of secondary school special education exiters who leave school by graduating, dropping out, or exceeding the age limit for school attendance.*

In examining dropout and graduation rates by disability category, we find that the overall rate presented in Table 2 masks large variations in dropout and graduation rates for students with different primary disabilities. Although the graduation rates for youth with orthopedic, visual, or hearing impairments approach the rate for nondisabled students, the graduation rates for youth with emotional disturbances, mental retardation, or multiple handicaps are below 50% ($p<.01$). NLTS findings

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* In Table 3, percentages are weighted to represent youth in each primary disability category and age group (see appendix). Sample sizes are unweighted. Primary disability category is based on reports from schools or school districts.

Table 2

COMPARISON OF DROPOUT AND GRADUATION RATES
FOR DISABLED AND NONDISABLED YOUTH

Disabled Youth	% Dropout	% Graduate
National Longitudinal Transition Study	36.4	56.2[a]
U.S. Department of Education	26.3	59.8[b]
Nondisabled Youth		
U.S. Department of Education	29.4[c]	70.6
U.S. Bureau of the Census	26.1[d]	73.9
Center for Education Statistics	25.9[e]	74.1
High School and Beyond	14.4[f]	--

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a Graduation is defined as receipt of a regular diploma, a certificate of completion or special diploma determined from parent reports & school records. Both graduation & dropout rates are based on a 2-year period (the 1985-86 and 1986-87 school years). There is no significant difference in the dropout rate for these two years.

b Graduation is defined similarly, but is based on a 1-year period (the 1985-86 school year) as reported by states (OSEP, 1988).

c Based on the Department of Education Wall Chart estimates for 1985 (U.S. Department of Education, 1987). This figure is an attrition rate (ratio of the number of public high school graduates in 1985 to ninth grade enrollment 4 years earlier).

d Based on the Census' Current Population Survey of households (adults 25 years and over) in 1985 (U.S. Department of Commerce, Bureau of the Census, 1987[a]).

e Estimated based on the graduation rate for 1984 as reported in the Condition of Education (1986).

f Percentage of public school students enrolled as high school sophomores in spring 1980 who did not graduate nor enroll in high school in spring 1982 (Barro & Kolstad, 1986).

Source: NLTS data on school completion status are based on school records and parent reports.

Table 3

SECONDARY SCHOOL COMPLETION STATUS (AND STANDARD ERRORS)
OF SPECIAL EDUCATION EXITERS IN TWO YEARS

Disability Category	Percentage of Exiters in 2 Years Who: Graduated	Dropped Out	Aged Out	Sample Size
All conditions	56.2 (0.9)	36.4 (0.9)	7.5 (0.5)	3045
Learning disabled	61.0 (2.1)	36.1 (2.1)	2.9 (0.7)	533
Emotionally disturbed	41.8 (2.7)	54.7 (2.7)	3.6 (1.0)	334
Mentally retarded	49.9 (2.3)	33.6 (2.2)	16.5 (1.7)	459
Speech impaired	62.7 (3.2)	32.5 (3.1)	4.8 (1.4)	222
Visually impaired	69.5 (2.8)	16.8 (2.2)	13.7 (2.1)	279
Deaf	71.8 (2.4)	11.8 (1.7)	16.4 (2.0)	354
Hard of hearing	72.3 (2.8)	15.5 (2.3)	12.2 (2.1)	249
Orthopedically impaired	76.5 (2.7)	15.6 (2.3)	7.9 (1.7)	246
Other health impaired	65.4 (4.0)	25.9 (3.7)	8.7 (2.4)	142
Multiply handicapped	32.2 (3.5)	17.6 (2.8)	50.2 (3.7)	182
Deaf/blind	43.1 (7.4)	7.8 (4.0)	49.2 (7.5)	45

Source: NLTS data on school completion status are based on school records and parent reports.

indicate that youth with emotional disturbances are the most likely to drop out (55%), followed by youth with learning disabilities (36%), mental retardation (34%) and speech impairments (33%). Compared to other disability groups, deaf/blind exiters have the lowest dropout and one of the highest ageout rates (8% and 49%). OSEP (1988) data for the 1985-86 school year indicate similar findings.

Research has also pointed to a common set of reasons given for students dropping out of school: poor academic performance, some type of handicap or limiting condition (e.g., lower intelligence scores), not liking school (e.g., not seeing the relevance of school to the outside world), and disciplinary problems (Barro and Kolstad, 1986; Center for Education Statistics, 1986; Rumberger, 1983). Table 4 summarizes the reasons most commonly cited by parents for disabled youth dropping out of school. Although sample sizes are small for several categories, it appears that their reasons are largely the same as for nondisabled youth: they don't like school (30%), they are not doing well in school (28%), and their negative behavior is causing problems in school (17%). These findings are consistent with recent studies of special education dropouts in California and Florida (Jay and Padilla, 1987; Project Transition, 1987).

Just as there is variation by disability in the percentage of students dropping out, so too are there differences in the reasons for dropping out. For example, youth in both the emotionally disturbed and learning disabled categories are reported by parents to drop out because they do not like school (31% and 30%, respectively), but their negative attitudes about school appear to be influenced by different factors. Parents of emotionally disturbed youth indicate that behavior problems are a strong influence on dropping out (27%), while parents of learning disabled youth cite poor grades or not doing well in school (33%) as a contributor to dropping out. By contrast, health or disability-related problems are cited by parents of about half of health impaired youth and about 40% of youth with multiple handicaps who drop out.

Table 4

REASONS FOR DROPPING OUT OF SECONDARY SCHOOL
AMONG YOUTH WITH DISABILITIES (WITH STANDARD ERRORS)

Reasons for Dropping Out	Total	Primary Disability Category: Learning Disabled	Emotionally Disturbed	Mentally Retarded	Speech Impaired	Visually Impaired	Hard of Hearing	Deaf	Deaf/ Blind	Orthoped-ically Impaired	Health Impaired	Multiply Handi-capped
Percentage of youth reported by parents to have dropped out of secondary school because of:												
Pregnancy/childrearing	7.8 (1.5)	8.9 (3.2)	5.8 (2.5)	6.7 (3.9)	0.0 (0.0)	24.0 (13.0)	34.2 (11.9)	15.4 (8.7)	-	0.0 (0.0)	2.0 (3.5)	0.0 (0.0)
Poor grades, not doing well in school	28.1 (2.8)	32.7 (6.1)	19.1 (4.5)	26.3 (7.7)	30.0 (12.5)	15.7 (10.5)	12.6 (7.2)	11.3 (7.5)	-	15.6 (8.6)	8.9 (7.4)	0.0 (0.0)
Wanting/needing a job	9.4 (1.6)	10.9 (1.7)	5.0 (1.2)	12.0 (1.8)	0.0 (0.0)	0.0 (0.0)	7.0 (1.4)	.0 (0.0)	-	0.0 (0.0)	0.0* (0.0)	0.0 (0.0)
Moving	1.2 (0.6)	0.0 (0.0)	.7 (0.4)	5.5 (1.2)	10.0 (1.7)	0.0 (0.0)	1.5 (0.6)	2.6 (0.8)	-	4.2 (1.1)	4.2 (1.1)	0.0 (0.0)
Didn't like school	30.4 (2.9)	31.2 (2.9)	32.3 (3.0)	24.9 (2.6)	41.7 (3.4)	29.9 (2.9)	25.6 (2.6)	38.6 (3.2)	-	21.5 (2.4)	19.6 (2.3)	17.9 (2.2)
Illness/disability	5.2 (1.2)	2.8 (0.9)	6.9 (1.4)	7.7 (1.4)	4.2 (1.1)	16.4 (2.1)	13.3 (1.9)	3.5 (1.0)	-	32.7 (3.0)	49.1 (3.7)	39.6 (3.3)
Behavioral problems	16.6 (2.1)	14.4 (2.0)	26.8 (2.7)	13.6 (1.9)	12.1 (1.8)	0.0 (0.0)	3.3 (0.9)	2.6 (0.8)	-	0.0 (0.0)	4.9 (1.2)	4.4 (1.1)
Didn't get program youth wanted	3.3 (0.9)	5.0 (1.2)	1.2 (0.6)	0.0 (0.0)	0.0 (0.0)	5.3 (1.2)	3.8 (1.0)	2.6 (0.8)	-	0.0 (0.0)	0.0 (0.0)	10.3 (1.7)
Assorted other reasons	33.4 (3.0)	38.9 (3.3)	28.0 (2.8)	19.3 (2.3)	40.6 (3.3)	17.2 (2.2)	29.1 (2.8)	40.9 (3.3)	-	34.4 (3.1)	18.5 (2.2)	50.3 (3.7)
(Number of respondents)	363	88	92	44	19	14	24	20	2	21	16	23

Source: NLTS parent interviews.

Relating Individual and Program Characteristics to Dropping Out

Analysis Procedures

For the purpose of studying dropout behavior, youth from the 11 federal categories were grouped into five clusters or groups on the basis of their functional abilities and disabilities. Preliminary analyses indicate that these groupings are significantly different from each other in relation to the dropout and graduation behavior analyzed here.

The five groupings of youth with disabilities analyzed and reported in this paper are:

- Group 1 (LESI) includes youth that have learning disabilities, emotional disturbances or speech impairments, who are not institutionalized and not mentally retarded.
- Group 2 (EMR/TRM) includes youth with mild or moderate mental retardation who may or may not also have other impairments.
- Group 3 (PI) involves youth with health or orthopedic impairments who are not mentally retarded (referred to as physically impaired).
- Group 4 (HI) includes youth who are deaf or hard of hearing and not mentally retarded.
- Group 5 (VI) is youth who are visually impaired and not mentally retarded.

Youth who have multiple handicaps, severe mental retardation or who are deaf/blind are not included in the analyses because there are few dropouts in this group and because the school factors of interest generally do not apply to them.

Analyses are conducted for these larger groupings, rather than for each of the 11 individual disability categories, because the sample size for many categories is too small for the complex explanatory models developed. Groups are defined to maximize the homogeneity of disabilities and experiences of youth within the groups.

The disabilites represented by the five groups used in these analyses make up 96% of all secondary school youth with disabilities (U.S. Department of Education, 1988). Groups 1 and 2 account for approximately 64% of all secondary school special education exiters.

Dropout behavior is measured as a dichotomous variable with a value of one for dropouts and a value of zero for graduates. Youth who graduate or dropout constitute 93% of special education exiters. Youth who age out are excluded in the analyses. For these analyses, graduation is based on school record's or parent reports and may include receipt of a regular diploma, a certificate of completion, or a special diploma.

Logistic regression results are unweighted, unlike the weighted descriptive findings reported in the paper thus far. Weights are based on the primary disability category of the youth and enhance the generalizability of descriptive findings. However, when youth from different disability categories are combined into larger groupings for the multivariate analyses, youth with vastly different weights are combined. Results are skewed and generalizable primarily to youth with larger weights. For example, in Group 1, youth with learning disabilities have much larger weights than youth with speech impairments or emotional disturbances because the sample of youth with learning disabilities generalizes to almost half the special education students at the secondary level. Weighted analyses of Group 1, therefore, are dominated by youth from the LD category and do not illuminate factors affecting school completion of youth with speech impairments or emotional disturbances. Unweighted analyses better represent the mixture of disability types within the disability groupings.

Analyses were performed in two ways. Initial analyses examined only the effects of individual characteristics and experiences of the youth on the propensity to drop out, in the absence of youth's school performance factors and school characteristics for each category of youth. A second analysis added these school characteristics and youth performance factors to determine the additional explanatory power they add to the models. Results are reported for the complete models in two ways: (1) for all groups with youth

background, ability/disability, and behavioral measures included, and (2) for two groups with school characteristics and youth's school performance measures included.

Independent Variables

The explanatory variables used in the logistic regression models to extimate dropout behavior include measures of the youth's background characteristics, youth's abilities and disabilities, youth's behavior and experiences, youth's performance in high school, and characteristics.

The independent variables are described below and summarized in Table 5. As previously mentioned, the data on youth and school variables come from three sources: a parent interview, a student record abstract, and a school survey instrument. Descriptive statistics for the independent variables used in the analyses are reported in the appendix.

Youth's Background Characteristics

Research on nondisabled youth has demonstrated the effects of several personal and family characteristics on the likelihood of dropping out (GAO, 1986; Bureau of the Census, 1987b). Analyses of High School and Beyond data, for example, indicate that youth with poor academic performance, lower cognitive ability, who exhibit deliquent behavior, and those from households with lower socioeconomic status have a higher chance of dropping out of school (NCES, 1986). Do similar relationships hold for youth with disabilities? To test the effects on the likelihood of dropping out for youth with disabilities, the following variables, taken primarily from parent interviews, were included in the analyses:

- The youth's age.
- The youth's gender (1=male; 0=female).
- Ethnic background (1=minority, 0=white).

Table 5
DESCRIPTION OF INDEPENDENT VARIABLES

Variable Name	Description of Variable	Type	Source
AGE	Youth's age in years (15-27 years old)	Continuous	Parent interview
SEX	Youth's gender (1=male, 0=female)	Dichotomous	Parent interview
PA9MIN	Youth's ethnic background (1=minority, 0=non-minority)	Dichotomous	Parent interview
PG7_NEW	Socioeconomic status measured by the educational level of the head of household (1=no high school diploma, 2=high school graduate, 3=some college education, 4=college degree or more)	Scale	Parent interview
PG1	Socioeconomic status measured by single parent family	Dichotomous	Parent interview
PG8	Socioeconomic status measured by employment of the head of household	Dichotomous	Parent interview
IURBAN/IRURAL	Urbanicity (1=urban or rural, 0=suburban)	Dichotomous	School survey
BADACTOR	Youth has had disciplinary problems (i.e., fired, suspended or expelled, arrested incarcerated)	Dichotomous	Parent interview or record abstract
PGROUP	Degree of social integration of the youth measured by belonging to any school or community group in the past year	Dichotomous	Parent interview
IA13_IQ	Youth's IQ	Continuous	Record abstract
P_INTEL	Youth's functional ability measured by how well youth perform four functional tasks on his/her own: counting change, telling time on a clock with hands, reading common signs, and looking up names in a telephone book and using the telephone (1=not at all well, 4=very well). Scores were summed to create a scale ranging from 4-16.	Scale	Parent interview
For youth in LESI group:			
SPEECH	Youth with any speech impairment	Dichotomous	Parent interview or record abstract
ED	Youth with any emotional disturbance	Dichotomous	Parent interview or record abstract
For youth in the EMR/TMR group:			
SPEECH	Youth with any speech disability	Dichotomous	Parent interview or record abstract
ED	Youth with any emotional disturbance	Dichotomous	Parent interview or record abstract
SENSPHYS	Youth with any physical or sensory disability	Dichotomous	Parent interview or record abstract
TMR	Youth with TMR disability	Dichotomous	Parent interview or record abstract

Table 5 (concluded)
DESCRIPTION OF INDEPENDENT VARIABLES

Variable Name	Description of Variable	Type	Source
For youth in the physically impaired group:			
SPEECH	Youth with a speech disability in addition to their health or orthopedic impairment	Dichotomous	Parent interview or record abstract
P_PHYS2	Youth who use a physical aid, such as a wheel chair, crutches, cane, walker, prosethetic, or orthotic	Dichotomous	Parent interview or record abstract
P_SELFC	Physical functioning is a measure of how well the youth could perform three basic self-care taks on his/her own, without help: dress, feed oneself, and get around to places outside the home (1=not at all well, 4=very well). Scores were summed to create a scale ranging from 3-12).	Scale	Parent interview
For youth in the hearing impaired group:			
DEAF	Youth who are deaf as opposed to hard of hearing	Dichotomous	Parent interview or record abstract
ONSETLT3	Onset of youth's disability (1=before the age of three, 0=at age three or after)	Dichotomous	Parent interview
Youth's school performance			
I_ABSENT	Number of days absent from school (maximum of 60 days)	Continuous	Record abstract
A_FLUNK	Youth failed one or more classes	Dichotomous	Record abstract
School characteristics			
SA7	School size indicated by average daily attendance	Continuous	School survey
SA4	Percent of the student body that is low-income (1=less than 10%, 2=10% to 25%, 3=26% to 50%, 4=more than 50%)	Scale	School survey

- Socioeconomic status, measured by the educational level of the head of household (1=no high school diploma, 2=high school graduate, 3=some college education, 4=college degree or more), whether this is a single parent family, and whether the head of household is employed.

- Urbanicity, measured by two dichotomous variables indicating if the youth attends school in an urban area or a rural area. The comparison condition is attending school in a suburban area.

Youth's Behavior and Experience

In addition to their demographic characteristics, youth exhibit particular behaviors and have certain experiences that are expected either to influence their chances of dropping out directly, or to be confounded with the nature of their school program or setting, requiring that they be controlled in the analysis to identify the independent effects of these variables on the likelihood of dropping out. These variables include:

- Whether the youth has had disciplinary problems. A dichotomous variable distinguishes youth whose parents report they have had one or more of a specific set of disciplinary problems from those reported to have had none of them. These disciplinary problems include: ever being fired from a job, leaving school because of suspension or expulsion, or ever being arrested or incarcerated. We hypothesized that youth who have experienced disciplinary problems are more likely to drop out of school.

- The degree of social integration of the youth is measured by a dichotomous variable indicating whether the parent reported the youth belonged to any school or community group in the past year. Youth who do not belong to any such groups, are expected to be disproportionately represented among those who drop out.

Youth's Abilities/Disabilities

Although the analyses are conducted separately for youth in different disability groupings, within groups there is still considerable variation in the combination and severity of disabilities, which could affect the likelihood of dropping out. Disability characteristics also relate to the kinds of services received and, potentially, their effects. Several

variables related to variations in disability within disability groupings are included in the analyses to test their direct effects on the probability of dropping out. They include:

- The youth's IQ, as reported by his/her school (used in all analyses). Research has demonstrated that grades are a function in part of cognitive ability for nondisabled youth (Fetters, Brown and Owings, 1984).

- The youth's functional ability (used in all analyses), measured by a scale based on parents' reports of how well youth perform four functional tasks on his/her own, without help: counting change, telling time on a clock with hands, reading common signs, and looking up names in the telephone book and using the telephone. Youth were scored from 1 (does the task "not at all well") to 4 (does the task "very well") on each task. Summing these scores on the 4 tasks creates a scale ranging from 4 to 16.

- For youth in Group 1 (LESI), two dichotomous variables are used to designate youth with a speech impairment or an emotional disturbance, as designated by schools. These variables are used so that, for example, the coefficients related to receiving speech therapy are not absorbing variation attributable to being speech impaired.

- For youth in the EMR/TMR group, three dichotomous variables distinguish youth with any speech disability, any emotional disturbance, or any physical or sensory disability, in addition to their mental retardation. One might expect that having any of these disabilities, in addition to the mental retardation that qualified the youth for this Group, might affect the choice of a youth's educational program and/or further challenge the youth's ability to succeed in school.

- For youth in the physically impaired group, two dichotomous variables distinguish youth with any speech disability or any sensory disability, in addition to the health or orthopedic impairment that qualified them for this group. A third dichotomous variable distinguishes youth whose parents report they use a physical aid, such as a wheel chair, crutches, cane, walker, prosthetic, or orthotic, from those who reportedly do not. Finally, physical functioning is measured using a scale based on parents reports of how well the youth could perform three basic self-care tasks on his/her own, without help: dress oneself, feed oneself, and get around to places outside the home, such as a nearby park or neighbor's house. Youth were scored from 1 (does the task "not at all well") to 4 (does the task "very well") on each task. Summing these scores on the tasks creates a scale ranging from 3 to 12.

- For hearing impaired youth, one dichotomous variable distinguishes youth who are categorized by their school or district as deaf from those who are labelled hard of hearing. A second dichotomous variable distinguishes youth who are reported by parents as having trouble with their disability before the age of three from those who began having trouble at a later age. This variable controls primarily for the effects of variations in speech acquisition.

Youth's School Performance

Two measures of youth's performance in school are included in the analysis, whether the student has failed any classes in high school and the number of days absent from school in the last full year attended. The school performance variables are described below:

- Whether a youth has failed any classes. A dichotomous variable distinguishes youth whose school records indicate they have failed one or more classes from those whose records did not indicate they failed any classes during their most recent year in school (any ungraded classes taken were excluded for obvious reasons).

- The number of days youth was absent from school. A continuous variable based on youths' school records, which ranges from 0 days absent to a maximum of 60 days absent. We expected youth with few days absent to be less likely to drop out; youth with many days absent to be more likely to drop out and less likely to graduate. The range of days absent was truncated at 60 or more in order to minimize overestimation due to extreme values.

School Characteristics

The second focus of our analyses involves assessing the effects of school demographics on the likelihood of dropping out. Variables drawn from a survey of schools attended by youth, include:

- School size, measured by a continuous variable indicating the average daily attendance at the school. For the nondisabled population, large schools have a negative influence on staying in school.

- The percent of the student body that is low-income is indicated by a categorical variable with the following values: 1=less than 10%, 2=10% to 25%, 3=26% to 50%, and 4=more than 50%. Schools with a high percentage of students from low-income families often have high dropout rates.

Findings

Characteristics of Youth

Table 6 demonstrates that certain background characteristics of youth with disabilities are strongly related to whether he/she remains in school or drops out. Much of the explanatory power of the models developed belongs to variables related to characteristics of the youth. Across groups, one student background characteristic emerges as being significantly related to dropping out and graduating from high school: the youth's age. Head-of-household's education and whether head-of-household is employed are also significantly related to dropout behavior in certain disability groups.

The older the student is, the lower the likelihood of dropping out, and conversely, the higher the chances of graduating. This suggests that students who encounter difficulties in high school may be dropping out at earlier ages and that, if youth remain in school until the upper grades, they are more likely to complete high school. This conclusion is supported by findings of the National Transition Study that the percentage of youth receiving at least one failing grade changes significantly between 10th and 11th grade students, i.e., from 42% of 9th and 10th grade students to 34% of 11th grade students ($p<.05$; Wagner and Shaver, 1989).

Dropping out is also associated with head-of-household's education. The higher the education level of the parent, the lower the probability that a youth will drop out and the greater the likelihood that the youth will graduate. Similarly, if the head-of-household is employed, the likelihood that the youth will drop out is less. The literature suggests that when families experience financial difficulties, children's educational performance and attainment can suffer. Head-of-household's employment status was significantly related to dropping out or graduating, in two groups, the hearing impaired and the visually impaired, in which youth from households where the parent or guardian is employed were less likely to drop out.

Table 6

EFFECTS OF INDIVIDUAL CHARACTERISTICS ON
LOG ODDS OF DROPPING OUT OF SCHOOL BY DISABILITY GROUP

Independent Variables	LESI	EMR/TMR	Physical	Hearing	Visual
Youth Background					
Age	-0.71***	-0.62***	-0.59**	-0.71***	-1.09***
Sex (1 = male)	0.44	-0.76*	0.11	-0.49	0.77
Minority (1 = minority)	0.12	-0.31	-0.35	-0.38	-0.22
Head of household education	-0.32*	-0.09	-0.60*	-0.67**	0.20
Single parent family	0.31	0.12	-0.41	-0.37	-0.14
Head of household is employed	-0.48*	-0.14	-1.02	-1.45**	-1.66
Urban area	0.25	0.96	-0.79	1.00	-0.28
Rural area	-0.08	0.84	-0.63	1.12	0.43
Abilities/Disabilities					
IQ	0.00	-0.02	0.00	0.02	-0.05*
Functional ability scale	-0.36***	-0.05	-0.17	-0.23	-0.07
Has any speech disability	-0.49	0.08			
Has any emotional disability	0.00	0.67			
Youth is deaf				-0.15	
Has any sensory or physical disability		0.23			
Uses physical aid device			-1.27		
Self-care ability scale			-0.22		
Age of onset of disability				-0.27	
Youth Behaviors/Experiences					
Exhibits negative behavior	2.07***	2.08***	2.29**	2.45***	--
Belongs to group	-1.68***	-0.78	-2.06*	-1.18*	-0.99
N	618	294	181	358	163
Proportion dropped out	.27	.18	.16	.11	.10
Chi square for L.R. test against model with no variables	251.31	67.13	55.73	74.46	27.49
(df)	(14)	(15)	(14)	(14)	(11)
p	.0	.0000	.0000	.0	.004
R	.56	.36	.42	.44	.22

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$
-- Too few cases to include in the model.

Source: NLTS data based on parent interviews and school surveys.

Contrary to observations in the general population, no consistent gender differences were found in the dropout/graduation behavior of special education students. Also contrary to previous findings in the general population, a youth's racial/ethnic background appears to be unrelated to dropping out, when youth's behavior and experiences are included in the model.

There is some evidence in the research literature that suggests that children from single parent families (a factor often contributing to low-income families) are more likely to be "at risk" and therefore more likely to dropout or not to graduate. As indicated in Table 6, in this analysis of special education students, no significant relationship was found between family configuration and the educational outcome measure when other factors are controlled.

Our analysis also measured whether the high school the youth attended is in an urban, suburban or rural environment. Research on dropouts suggests that "urbanicity" can serve as a proxy for unmeasured factors both positive and negative, such as the youth unemployment rate, crime and drug problems, or the availability of programs and services in the community that can affect students' persistence in high school. Urbanicity was found to be unrelated to dropping out in all five groups.

Regarding youths' abilities and disabilities, IQ is generally not related to dropping out or graduating. In four of the five groups tested IQ is not significant; in the visually impaired group IQ is negatively related to dropping out. To a degree, this mixed result for IQ was expected because the clustering of students into groups to a great extent confounds the effect of IQ on the outcome measure, i.e., the between-group differences being greater than the within-group differences in IQ. Youth's functional ability, as measured by how well the youth performed four functional tasks, was significantly related to dropout/graduate behavior in the LESI group. Youth who scored higher on the functional ability scale were less likely to drop out, more likely to graduate. Other variables associated with youth's specific disabilities within groups, were not significantly related to dropout behavior.

Two measures of youth's behavior (exhibits negative behavior and belongs to group) are both significant in the LESI group, the physically impaired group and the hearing impaired group, with a youth's negative behavior consistently related to dropping out in the four groups tested. The effect of having behavior problems is independent of being classified as emotionally disturbed, which is controlled for separately in the model. Belonging to a group is also significantly related to dropout and graduation behavior, in reducing the likelihood of dropping out for LESI, physically impaired and hearing impaired youth.

School Characteristics and Student Performance

The effect of school characteristics and youth's school performance on dropout behavior was also studied for Groups 1 and 2, by adding those variables to the logistic regression model, as presented in Table 7. (An insufficient number of cases were available to analyze these variables in the other disability groups; the omitted disability groups account for about 7% of the total secondary special education population.)

Youth's school performance is measured by a dichotomous variable distinguishing students who had failed one or more classes in their most recent year in school. Failing one or more courses was found to be a strong predictor of dropping out in both groups. Youth who had failed a course were more likely to dropout and less likely to graduate than youth who did not fail any courses. (Because the definition of failure requires that a youth be enrolled in a graded program, a segment of the EMR/TMR sample were excluded from this analysis due to their participation in ungraded programs.)

Number of days absent from school (capped at 60 days) is used as an indicator of the youth's school attendance. Being absent from school is significantly related to dropping out in both groups. As expected, the higher the number of days absent, the greater the likelihood of dropping out.

Table 7

EFFECTS OF INDIVIDUAL AND SCHOOL CHARACTERISTICS ON
LOG ODDS OF DROPPING OUT OF SCHOOL BY DISABILITY GROUP

Independent Variables	LESI	EMR/TMR
Youth Background		
Age	-1.04***	-0.48*
Sex (1 = male)	0.54	-1.61*
Minority (1 = minority)	-0.04	-1.05
Head of household education	-0.25	-0.12
Single parent family	0.25	0.88
Head of household is employed	-0.50	0.18
Urban area	0.18	0.91
Rural area	0.63	0.12
Abilities/Disabilities		
IQ	0.00	-0.02
Functional ability scale	-0.30*	-0.11
Has any speech disability	0.14	-0.49
Has any emotional disability	0.09	0.72
Youth is deaf	.	.
Has any sensory or physical disability	--	0.13
Uses physical aid device	.	.
Self-care ability scale	.	.
Age of onset of disability	.	.
Youth Behaviors/Experiences		
Exhibits negative behavior	1.11*	2.22**
Belongs to group	-1.92**	-0.21
Youth has failed 1 or more classes	2.11***	2.74**
Absence from school	0.04**	0.06**
School Characteristics		
Percent low income enrollment	-0.18	0.12
Average daily attendance	-0.00	-0.00
N	348	203
Proportion dropped out	.18	.15
Chi square for L.R. test against model with no variables	151.24	75.88
(df)	(18)	(19)
p	.0	.0000
R	.59	.47

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

Source: NLTS data based on parent interviews and school surveys.

Two school characteristics were also tested to determine if they are associated with the likelihood of dropping out: the proportion of students from low income families, and school size (average daily attendence). Research on nondisabled youth suggests that the quality or availability of educational programs (quality often being poorer in high poverty schools) and school size are factors associated with dropping out. It is interesting to note that school characteristics were not related to dropping out in either group. Descriptive statistics for the variables used in the logistic regression models are reported in the appendix.

Predictive Power of the Models

The logistic regression models presented here attempt to explain the dropout and graduation behavior of youth with disabilities in terms of the particular characteristics of the youth and the youth's behavior. The models control for a number of important characteristics of the youth (individual and family background characteristics, abilities and disabilities) and of the school (size and low income enrollment). The explanatory models also included indicators of student social behavior and academic performance (youth belongs to a group, exhibits negative behavior, failed one or more classes).

In general, the models fit the data reasonably well, especially for the two groups of disabled students, LESI and EMR/TMR groups, that account for the largest number of the special education dropouts nationally (over 93%). Chi-square tests of the significance of the models are reported at the bottom of each table. In all the groups except the visually impaired, the models reported are significant ($p < .01$). For the LESI group, for example, the correlation between the actual dropout/graduate behavior and the predicted outcome using log likelihood estimates range from $r = .56$ for the individual characteristics model (Table 6) to $r = .59$ for the school characteristics and student performance model (Table 7). For the EMR/TMR group the corresponding models fit the data somewhat less well ($r = .36$ and $r = .47$, respectively.

One indication of the explanatory power of a logistic regression model, in which the outcome is a dichotomous variable, is the extent to which the model correctly predicts actual outcomes. Figure 1 demonstrates the predictive power of selected dropout models at different levels of fit with the data (r). The percent of cases accurately predicted to drop out or graduate are displayed for different ranges (deciles) of estimated probability.

In Figure 1, for example, using a model with a correlation (r) of about .5, such as the model reported in Table 6, more than 50% of all the cases whose actual outcome is "graduate," the model estimates a probability of dropping out of less than 10% (or .90 probability of graduating). For another 20% of the cases who actually graduate, the model estimates a probability of dropping out of between 10% and 20%. Thus, for more than 80% of students who graduate, the model predicts a probability of graduating of greater than 70%. Similarly, for about 80% of students who are dropouts, the model estimates a probability of dropping out of 80% or greater.

Summary of Findings

Our analyses suggest that some individual characteristics and behaviors are significantly related to the likelihood that youth with disabilities will drop out of high school. The following conclusions are suggested by the results presented in this paper:

- Certain student behaviors distinguish dropouts from graduates in the special education population, just as in the general population, suggesting that early identification of special education students who are especially "at risk" may be possible: (1) Youth with disabilities who experience disciplinary problems are clearly "at risk" of dropping out and not successfully completing high school. Youth who exhibit negative social behavior, either inside or outside school (ever suspended or expelled from school, fired from a job, ever been arrested or incarcerated), are more likely to drop out and less likely to graduate. (2) Youth who receive failing grades, are also more likely to drop out, and therefore less likely to graduate.

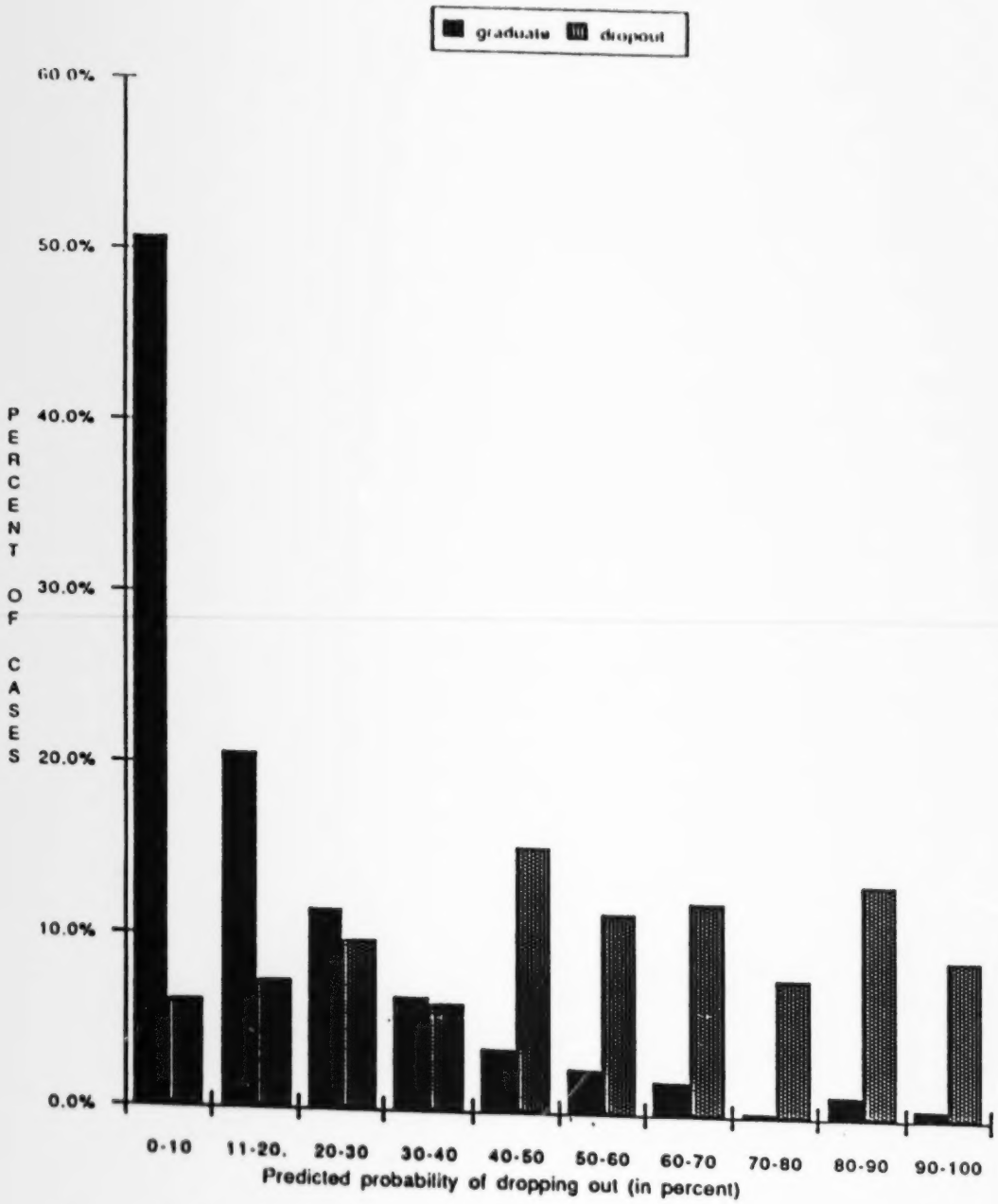

Figure 1: Predictive Power of the Dropout Model for Special Education Dropouts and Graduates in Cluster 1 (LESI disabilities) (R = 0.5)

- Although the school effects literature suggests that school size and other characteristics of the educational setting are associated with dropout and graduation behavior, no significant school effects were observed in this analysis of special education students.

Implications

Estimates of the dropout and graduation rates of special education students derived from the National Transition Study clearly indicate that special education students in many disability categories drop out at higher rates than their nondisabled peers and that, in the aggregate, youth with disabilities graduate at lower rates than youth without disabilities (Jay and Padilla, 1988). We have presented further evidence that the disparity between the successful secondary school completion of youth with disabilities and nondisabled youth is indeed real and substantial for youth in certain disability groups. What can schools do to ameliarate this situation?

One answer to this question is evident from a recognition that the major factors contributing to the likelihood of dropping out for special education students are behavioral. We have identified several student behaviors that distinguish dropouts from graduates in the special education population: youth who experience disciplinary problems, youth who fail classes, and youth who have poor attendance records (high absenteeism) have a greater likelihood of dropping out and a lower likelihood of graduating. Conceptually, it may be somewhat unclear whether these student behaviors contribute to dropping out or are simply symptomatic of potential dropouts. What is clear is that these behaviors are antecedents of dropping out. Such behaviors, which are easily identified, might serve as indicators of special education students who are especially "at risk" of dropping out. Once the students are identified, appropriate interventions could be applied that would address the root causes of the absenteeism or disciplinary problems that are precursors of dropping out (e.g., negative behavior may be a reaction to the frustration some disabled youth face in school both academically and socially.

The explanation given by parents for youth leaving school (didn't like school, not doing well in school, behavioral problems) suggest youth who are

disconnected or are growing detached from school. This may suggest that researchers and practitioners may need to better attend to the social, as well as the academic, integration of special education students in trying to determine what will help youth stay in school and successfully complete high school.

In the context of our present findings about the dropout behavior of youth with disabilities, what kinds of programs or services improve students' chances of graduating and reduce the chances of dropping out? We plan to address this important question in subsequent analyses. Wagner and Shaver (1989), in an analysis of the educational programs and academic achievements of secondary special education students using NLTS data, found that specific services do contribute to the school achievement of youth in some disability groups. Such results offer promising indications that programs and services reduce the likelihood that students fail courses in school, indirectly improve a student's likelihood of graduating rather than dropping out, and ultimately affect the youth's transition beyond high school.

Other resources may also be available within schools that are not currently focused on dropout prevention for special education students. Are special education students included in dropout prevention programs currently operating in secondary schools? Recent research in two states indicates that few special education students are included in alternative programs designed to keep youth from dropping out (Jay and Padilla, 1987; Project Transition, 1986). Including special education students in such programs would have implications for their content and conduct. It is unknown whether effective dropout prevention approaches for regular education students are also effective for special education students. Because of the variety of transition experiences of youth with different kinds and levels of disabilities, dropout prevention programs for students with disabilities may need to be individualized, as are the educational services provided to youth with disabilities. A particular orientation to a dropout prevention program may be beneficial for youth with academic learning difficulties, for example, but inappropriate for youth with visual impairments, who are as likely to be college-bound as their nondisabled peers (Fairweather and Shaver, 1988).

At the outset of this paper, we demonstrated that special education students differ from their nondisabled peers not only in that they are diagnosed as having a disability, but that they disproportionately experience poverty. In a sense, these factors can be two strikes against these youth as they work within the educational system. We have also demonstrated that special education students in the largest disability categories drop out of high school at higher rates than youth without disabilities. Despite the fact that special education students are disproportionately represented among dropouts, the growing attention given to the dropout problem among educators and policymakers has largely overlooked these students. Future considerations of educational policies such as those of educational reform may need to include attention to the impact on youth with disabilities, as well as "at risk" youth in general (McDill, Natriello, & Pallas, 1985; Bodner, Clark, & Mellard, 1987). Further, other analyses of NLTS data indicate that failure to graduate from high school significantly increases the likelihood that special education exiters will fail to become engaged in employment, postsecondary education, or any productive activities after high school (Butler-Nalin, Marder, and Shaver, 1989; Wagner, 1989). For these youth, the failure to graduate from high school may be a third strike against them.

We hope findings from the National Longitudinal Transition Study contribute to a greater understanding of the extent of, reasons for, and implications of dropping out among special education students. We further hope that this greater understanding will help to broaden the focus of the research, policy debate, and programming in the dropout arena to include greater attention to the particular needs of special education students.

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Appendix

OVERVIEW OF THE NATIONAL LONGITUDINAL TRANSITION STUDY OF SPECIAL EDUCATION STUDENTS

As part of the 1983 amendments to the Education of All Handicapped Children Act (EHA), the Congress requested that the U.S. Department of Education conduct a national longitudinal study of the transition of secondary special education students to determine how they fare in terms of education, employment, and independent living. A 5-year study was mandated, which was to include youth from ages 13 to 21 who were in special education at the time they were selected and who represented all 11 federal disability categories.

In 1984, the Office of Special Education Programs (OSEP) of the U.S. Department of Education contracted with SRI International to determine a design, develop and field test data collection instruments, and select a sample for the National Transition Study. In April 1987, under a separate contract, SRI began the actual study.

Study Components

The National Transition Study has four major components:

- *The Parent/Youth Survey*. In the first year of the study, parents were interviewed by telephone to determine information on family background and expectations for the youth in the sample, characteristics of the youth, experiences with special services, the youth's educational attainment (including postsecondary education), employment experiences, and measures of social integration. This survey is expected to be repeated in 1989, when the youth will be interviewed if he/she is able to respond.

- *School Record Abstracts*. Information has been abstracted from the school records of sample youth for the previous year or for the last year they were in secondary school (either the 1985-86 or 1986-87 school years). Information abstracted from school records relates to courses taken, grades achieved (if in a graded program), placement, related services received from the school, status at the end of the year, attendance, IQ, and experiences with minimum competency testing. Records will be abstracted again in 1989 for youth still in secondary school in the 1988-89 school year.

- *School Program Survey*. Schools attended by sample youth in the 1986-87 school year were surveyed for information on student enrollment, staffing, programs and related services offered secondary special education students, policies affecting special education programs and students, and community resources for the disabled.

- *Explanatory Substudies*. More in-depth studies involving subsamples of the main sample will examine the pattern of transition outcomes achieved by youth who are out of secondary school and the relationship between school experiences and transition outcomes.

Sampling

Youth were selected for the sample through a two-stage sampling procedure. A sample of 450 school districts was randomly selected from the universe of approximately 14,000 school districts serving secondary (grade 7 or above) special education students, which had been stratified by region of the country, a measure of district wealth involving the proportion of students in poverty (Orshansky percentile), and district size (student enrollment).* Because of a low rate of agreement to participate from these districts, a replacement sample of 176 additional districts was selected. In addition, participation in the study was invited from the approximately 80 special schools serving secondary-age deaf, blind, and deaf-blind students. A total of approximately 300 school districts and 25 special schools agreed to have youth selected for the study.

Analysis of the potential bias of the district sample indicates no systematic bias that is likely to have an impact on study results when responding districts were compared to nonrespondents on the types of disabilities served, special education enrollment, participations in Vocational Rehabilitations agency programs, the extent of school-based resources for special education, community resources for the disabled, the configuration of other education agencies serving district students, metropolitan status, percent minority enrollment, grades served, and the age limit for service (see Javitz, 1987 for more information on the LEA bias analysis).

The sample of students was selected from rosters of all special education students ages 13 to 21 who were in grades 7 through 12 or whose birthdays were in 1972 or before. The roster of such students was stratified into 3 age groups (13 to 15, 16 to 18, over 18) for each of the 11 federal handicap categories and youth were randomly selected from each age/condition group so that at least 1,000 students would be selected in each handicap category (with the exception of deaf-blind, a low-incidence condition).

Exhibit A-1 indicates the number of youth sampled in each condition, the proportion for which different combinations of data were obtained, and the reasons for nonresponse for youth for whom data could not be obtained. A study of potential nonresponse bias is now being conducted to determine the representativeness of the youth sample.

Weighting Procedures and Population to Which Data Generalize

Youth with disabilities for whom data could be gathered were weighted to represent the U.S. population of such youth. In performing this weighting, three mutually exclusive groups of sample members were distinguished:

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* The 1983 Quality Education Data, Inc. (QED) database was used to construct the sampling frame. QED is a private nonprofit firm located in Denver, Colorado.

Exhibit A-1

Student Sample by Handicapping Condition

Status	LD	SED	MR	Speech	Ortho	Deaf	H of H	Blind	D/B	Health	Multi	Total
Number of contacts	1650	1321	1642	933	1060	1050	1372	1318	165	1005	1132	12648
No Further Contact Possible												
Unable to locate	59	59	84	50	49	41	70	63	5	33	45	558
Names not provided by LEA	206	271	55	92	18	99	197	120	0	362	212	1632
Deceased	2	0	4	0	11	0	3	2	3	5	2	32
Language barrier/non-Spanish	5	4	5	9	6	12	13	3	0	5	2	64
No respondent exists	23	21	28	18	9	20	11	20	2	9	16	177
Other	3	3	7	5	1	14	6	2	3	5	6	55
Nonworking number	233	178	341	157	146	149	180	193	29	115	94	1815
TOTAL	531	536	524	331	240	335	480	403	42	534	377	4333
(Percentage of total contacts)	32	41	32	35	23	32	35	31	25	53	33	34
Responses												
Completed interview-have consent form	506	326	533	232	388	402	470	475	73	246	362	4013
Completed interview-no consent form	395	258	314	217	216	259	231	255	35	131	159	2460
Total completed interviews	891	584	847	449	604	661	701	730	108	377	521	6473
(% of total contacts)	54	44	52	48	57	63	51	55	65	38	46	51
(% of those to be interviewed)	64	59	57	57	62	73	64	64	69	62	60	62
Have partial data (other sources)	37	43	42	18	35	15	15	20	2	11	24	262
Have partial interview (phone)	39	25	27	25	16	26	17	17	4	19	22	237
Have partial interview (mail)	20	21	49	15	25	23	17	20	4	10	30	234
Total participation	987	673	965	507	680	725	750	787	118	417	597	7206
(% of total contacts)	60	51	59	54	64	69	55	60	72	41	53	57
(% of those to be interviewed)	71	68	68	64	69	80	68	69	75	69	68	69
Refused interview	56	41	49	11	30	19	24	22	3	18	18	282
Refused in earlier contacts	11	3	6	2	20	0	1	3	1	3	9	59
Total refusals	67	44	46	13	50	19	25	25	4	21	27	341
(% of total contacts)	4	3	3	1	5	2	2	2	2	2	2	3
(% of those to be interviewed)	5	4	3	2	5	2	2	2	3	3	3	3
Other	29	20	19	22	8	14	18	18	4	14	22	238

A. Youth whose parents responded to the telephone-administered Parent Interview.

B. Youth whose parents did not respond to the telephone-administered Parent Interview, but were interviewed in the in-person nonrespondent study.

C. Youth whose parents did not respond to either the telephone or in-person Parent Interview, but for whom the school provided a record abstract.

All sample members belong to one of these three groups.

A primary concern in performing the weighting was to determine whether there was a nonresponse bias and to calculate the weights in such a way as to minimize that bias. Nonresponse bias was primarily of three types:*

1. Bias attributable to the inability to locate respondents because they had moved or had nonworking telephone numbers.

2. Bias attributable to refusal to complete a parent interview.

3. Bias attributable to circumstances that made it infeasible for the record abstractors to locate or process a student's record.

Of these three types of nonresponse, the first was believed to be the most important, both in terms of frequency and influence on the descriptive and explanatory analysis. Type 1 bias was also the only type of nonresponse that we could estimate and correct.

We estimated the magnitude of type 1 nonresponse bias by comparing responses on identical (or very similar) items in the three groups of respondents (after adjusting for differences in the frequency with which different handicaps were selected and differences in the size of the LEAs selected). Group A respondents were wealthier, more highly educated, and more likely to be Caucasian than group B respondents. In addition, group A respondents were much more likely to have youth who graduate from high school than group B or C respondents (who had similar dropout rates). On all other measurable items, the youth described by the three groups were similar, including sex, employment status, pay, self-care skills scale, household-care activities scale, functional mental skills scale, association with a social group, and length of time since leaving school. SRI determined that

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* In addition, there was a large group of nonrespondents who could not be located because their LEAs would not provide student names. Presumably, had these student names been available, many of those nonrespondents would have chosen to participate at about the same rate as parents in districts in which youth could be identified. The remaining nonrespondents would presumably have been distributed between the three types of nonresponse mentioned above.

adjusting the weights to eliminate bias in the income distribution would effectively eliminate bias in parental educational attainment and racial composition, but would have a negligible effect on dropout rates. It was also determined that group B and C respondents were present in sufficient numbers that if they were treated as no different from the group A respondents in the weighting process, the resultant dropout distribution would be approximately correct.

Weighting was accomplished using the following sequence of steps:

(1) Data from all three groups were used to estimate the income distribution for each handicapping condition that would have been obtained in the absence of type 1 nonresponse bias.

(2) Respondents from all three groups were combined and weighted up to the universe by handicapping condition. Weights were computed within strata used to select the sample (i.e., LEA size and wealth, and student age).

(3) Weights from four rare handicapping conditions (deaf/blind, deaf, orthopedically impaired, and visually impaired) were adjusted to increase the effective sample size. These adjustments primarily consisted of slightly increasing the weights of students in larger LEAs and decreasing the weights of students in smaller LEAs. Responses before and after these weighting adjustments were nearly identical, except for the deaf/blind. The adjustment for the deaf/blind consisted of removing a single respondent from a medium-sized LEA, who was being weighted up to represent two-thirds of all deaf/blind students. Hence, survey results do not represent deaf/blind students in medium or smaller-sized LEAs.

(4) The resultant weights were adjusted so that each handicapping condition exhibited the appropriate income distribution estimated in step 1 above. These adjustments were of modest magnitude (relative to the range of weights within handicapping condition)--the weights of the poorest respondents were multiplied by a factor of approximately 1.6 and the weights of the wealthiest respondents were multiplied by a factor of approximately 0.7.

Statistical Tests

A statistical procedure was used to compute the approximate standard errors of proportions and to test the difference between two proportions. We first computed the weighted percent of "yes" respondents to a survey item and then computed the effective sample size (i.e., the sum of the weights squared, divided by the sum of the squared weights). These two quantities were then used in the usual formula for the variance of a binomially distributed variable (i.e., pq/n where p is the weighted proportion of "yes" responses, q is the complement of p, and n is the effective sample size). To test the difference of two weighted proportions, we computed the difference between the weighted proportions and divided this quantity by the square root of the sum of the variances of the two proportions.

This procedure is only approximately correct because it adjusts only for the difference in weights, but not for cluster-sampling induced covariance among respondents. We are currently in the process of using pseudo-replication to compute more accurate variance estimates. We expect that the true variances are larger than calculated by the effective sample size method, and therefore that stated significance levels (e.g., $p < .01$) will be somewhat too small. Consequently, we have tended to be very conservative, and for the most part, highlight results that are significant at the .005 level.

Analysis

The first stage of the analysis study involves producing descriptive findings related to individual and family characteristics of youth, their experiences with services, their secondary school program, and their outcomes in terms of education, employment, and independent living. Descriptive questions include the following:

- What are the individual and family characteristics of handicapped youth served under EHA?
- What educational experiences and related services are handicapped youth provided under EHA? How do these vary for youth with different handicapping conditions and of different ages? What is the content, duration, intensity, coordination, and provider of these services?
- What are the characteristics of the schools serving youth with disabilities (e.g., with respect to grade levels served, programs and staff available, policies and practices regarding students with disabilities)?
- What are the achievements of youth with disabilities related to their education (secondary school and postsecondary), employment, and independence? How do these vary for youth with different kinds of disabilities?
- What combinations of services, experiences, and outcomes form transitional life paths for youth with different kinds of disabilities?

The second analysis stage will involve multivariate analyses to determine the relationships among the variables depicted in the conceptual model. Explanatory questions include:

- What factors combine to explain the patterns of services that youth receive?
- What factors explain the educational, employment, and independence outcomes of handicapped youth?
- What explains the paths youth take through secondary school and beyond with respect to services, experiences, and outcomes?

Reporting

Findings of the study will be presented in several forms through several channels. Statistical almanacs will present all the descriptive information available from the study for the total handicapped youth population and for each individual handicapping condition. Dissemination activities will entail conference presentations, journal articles, and mailings of key findings to participants in the study and others interested in its findings. A series of special topic reports will present findings from analyses addressing specific policy or research questions. Four methodology reports will detail the sampling, data collection, and analysis procedures used for the project and the reliability/validity of findings. A final report to OSEP will provide comprehensive documentation of findings.

APPENDIX Table 1

UNWEIGHTED MEANS (AND STANDARD DEVIATIONS)
OF INDIVIDUAL CHARACTERISTICS IN THE NATIONAL
LONGITUDINAL TRANSITION STUDY, BY DISABILITY GROUP

	LESI	EMR/TMR	Physical	Hearing	Visual
Dependent Variable Dropout/Graduate (1=Dropout)	0.27	0.18	0.16	0.11	0.09
Youth Background					
Age	19.30 (1.25)	19.91 (1.56)	19.18 (1.39)	19.67 (1.34)	19.25 (1.07)
Sex (1 = male)	0.72	0.53	0.51	0.50	0.57
Minority (1 = minority)	0.25	0.37	0.40	0.32	0.42
Head of household education	2.18 (1.16)	1.95 (1.15)	2.52 (1.36)	2.31 (1.21)	2.26 (1.15)
Single parent family	0.31	0.38	0.35	0.28	0.34
Head of household is employed	0.79	0.64	0.75	0.84	0.74
Urban area	0.31	0.32	0.57	0.46	0.41
Rural area	0.30	0.35	0.10	0.15	0.18
Abilities/Disabilities					
IQ	93.83 (13.62)	62.72 (10.15)	93.43 (17.95)	97.45 (13.49)	98.63 (14.50)
Functional ability scale	14.87 (1.76)	12.49 (3.26)	14.70 (2.28)	14.50 (1.80)	13.11 (3.04)
Has any speech disability	0.23	0.24	.	.	.
Has any emotional disability	0.28	0.10	.	.	.
Youth is deaf	.	.	.	0.65	.
Has any sensory or physical disability	.	0.36	.	.	.
Uses physical aid device	.	.	0.47	.	.
Self-care ability scale	. .	. .	10.30 (2.42)	.	.
Hearing problem before age 3	.	.	.	0.76	.
Youth Behaviors/Experiences					
Exhibits negative behavior	0.26	0.13	0.10	0.08	.
Belongs to group	0.30	0.28	0.35	0.39	0.40
N	618	294	181	358	163

APPENDIX Table 2

UNWEIGHTED MEANS (AND STANDARD DEVIATIONS)
OF SCHOOL PLACEMENT AND PERFORMANCE
IN THE NATIONAL LONGITUDINAL TRANSITION STUDY, BY DISABILITY GROUP

	LESI	EMR/TMR
Dependent Variable Dropout/Graduate (1=Dropout)	0.18	0.15
Youth Background		
Age	19.37 (1.23)	20.08 (1.50)
Sex (1 = male)	0.70	0.53
Minority (1 = minority)	0.19	0.39
Head of household education	2.19 (1.15)	1.95 (1.15)
Single parent family	0.30	0.41
Head of household is employed	0.79	0.65
Urban area	0.25	0.30
Rural area	0.34	0.40
Exhibits negative behavior	0.20	0.10
Belongs to group	0.35	0.32
Abilities/Disabilities		
IQ	92.94 (13.66)	62.72 (10.24)
Functional ability scale	15.00 (1.51)	12.46 (3.33)
Has any speech disability	0.27	0.29
Has any emotional disability	0.24	0.11
Has any sensory or physical disability		0.40
Youth Behaviors/Experiences		
Youth has failed 1 or more classes	0.24	0.09
Absence	12.84 (12.28)	11.18 (12.53)
School Characteristics		
Percent low income enrollment	2.19 (1.01)	2.67 (1.03)
Average daily attendance	1101.10 (661.14)	924.63 (908.38)
N	348	203